

## Notes on our Hepaticæ. II.

### The genus *Riccia*.<sup>1</sup>

LUCIEN M. UNDERWOOD.

The main purpose of these notes, made in reviewing the material that has been accumulating in my herbarium for the last few years, is to call the attention of local collectors to these much neglected and inconspicuous plants in order to learn more definitely their distribution. We still know almost nothing of the distribution of most of the American species, certain forms being known only from widely separated stations with no information from the intermediate territory. There is a strong probability that many species will yet be found especially in lowlands of the southern Atlantic states, in the Gulf states, and on the Pacific coast where the climatic conditions more nearly approach the Mediterranean region of the old world, where the genus is well developed.

The genus as now limited excludes the various forms of *R. fluitans* and *R. natans* which will form genera by themselves.

*RICCIA FROSTII* Aust. is probably widely distributed from the Rocky mountain region eastward to Illinois and Ohio. The specimens distributed as *Riccia crystallina* in *Hepaticæ Americanæ*, no. 63, are of this species. *R. Watsoni* Aust. founded on male plants is doubtless the same species, as originally suggested by its author. The only specimens purporting to be of this species that I have seen are in Herb. James from Wolf and Rothrock's collections on the Wheeler Survey; these are fertile and conform to the type of *R. Frostii*. Specimens from the eastern portion of the range are more robust than the mountain forms but the spore characters are similar; they may be characterized as follows:

*RICCIA FROSTII major*, n. var.—Thallus much larger than in the type, 3-4 times dichotomously branched, irregularly spreading and somewhat imbricate, the divisions wider, commonly tinted with purple at the margins.—Banks of Missouri River, St. Charles, Mo. (*Demetrio*, no. 5); Manhattan, Kansas (*Kellerman*); sterile forms are also at hand from Illinois (*Wolf*).

<sup>1</sup>No. I of this series is in this journal 14: 191-198. 1888.

*R. ALBIDA* Sulliv. is known only by two plants. The type was collected by Wright in Texas in 1845 and is in the Sullivant collection. I have received a single plant from Langlois, collected in Louisiana. Both plants are lacking in fruit. The plant is allied to *R. glauca* in its vegetative characters but its spores are a desideratum in order to understand its affinities.

*R. LAMELLOSA* Raddi as represented in Austin's *Hepaticæ Bor.-Am.* no. 140 has spores quite unlike those figured in Lindenberg (*Monog. Ricc. t.30*), lacking the hyaline margin. It may prove to be an undescribed species, but until Raddi's type, if in existence, can be seen it will be desirable to let it rest in its present position. The spores in this specimen are very characteristic, being  $84-94\mu$  in diameter, clearly and regularly but not strongly reticulated over the rounded surface. Austin's plants were from Closter, N. J.; the same plant has been sent from Mobile, Ala., by Dr. Mohr.

*R. ARVENSIS*, var. *HIRTA* Aust. is apparently a very distinct species differing widely from *R. arvensis* in the densely ciliate margins of the thallus and especially in the larger spores ( $92-108\mu$ ) which are nearly black and consequently almost opaque and very indistinctly reticulate. It was issued by Austin (*Hep. Bor.-Am.* no. 142) but the specimens in the set in my herbarium are sterile; Austin has described the spores in his MSS. now in my possession, which is important since they were omitted in the original description. Specimens sent me in 1884 by Parish from San Bernardino, other material collected by Bolander, and especially the fine material furnished by Dr. Campbell for our *exsiccatæ* (*Hepat. Amer.* no. 138) have enabled me to separate and distinguish this very distinct and elegant species, which will take the name ***Riccia hirta*** Aust. (1869, as synonym.)

*R. CALIFORNICA* Aust. was very imperfectly described and the type is inaccessible if in existence. I have referred to this species some sterile fragments from the California Academy of Science, and fragmentary fertile specimens collected near Berkeley by M. A. Howe, which closely agree with the brief description. The light brown spores with faint reticulations with very small areolæ ( $12-14$  measuring the convex surface of the spore) are quite characteristic of these specimens. More material is needed to trace the full character of the species and the same is true of its congeners *R. tumida*

Lindenb. (known only from the very imperfect specimens distributed in Austin's *Hepat. Bor.-Am.*) and *R. ciliata* which is known from this country only through the report of Austin, there being, so far as I know, no specimens at hand.

*R. CRYSTALLINA* L.—The figures of this species in Lindenberg's Monograph do not fairly represent the species as it appears in various European exsiccatae nor do they conform to the usual description. Misled by this inaccurate representation we issued plants under this name that are quite readily distinguished from *R. crystallina* now that suitable material is at hand for comparison. There is some resemblance between *R. crystallina* and *R. Frostii* in the method of dissemination of spores but they are distinguished by their thallus characters.

The following undescribed species have been sent in from southern and lower California:

***Riccia aggregata***, n. sp.—Thallus 1–3 dichotomous, forming more or less radiately divided crowded masses 1–2<sup>cm</sup> or more in diameter; divisions of the thallus narrow (1–1.5<sup>mm</sup>), solid, papillose-reticulate and green above, purplish beneath and provided with purplish scales not exceeding the margin of the thallus which is somewhat membranous; capsules rather prominent, with a purple spot in the thallus just above; spores 70–78 $\mu$  in diameter, nearly black, finely reticulate but almost opaque, scarcely margined.

On the ground, Pasadena, California, March 1893. (*A. F. McClatchie*, no. 24.)

***Riccia Catalinae***, n. sp.—Thallus thin, loosely attached to the soil, 3–4<sup>cm</sup> in diameter, stellately or radiately 3–6 dichotomous; divisions of the thallus broad (2–3<sup>mm</sup>), more or less reticulate-spongy above, the apices more or less expanded and emarginate, naked beneath and at the margins; capsules large, in one or two rows; spores 86–95 $\mu$  in diameter, very dark brown, nearly opaque, with very large obscure reticulations which often contain a free ridge-like crest, bordered with a more or less minutely crested margin.

Wet soil in a cañon, Santa Catalina Island, California, September, 1893. (*McClatchie*, no. 441.)

***Riccia Brandegei***, n. sp.—Thallus orbicular, 2–4<sup>cm</sup> in diameter, stellately many times divided, closely attached to the soil; divisions of the thallus narrow (1–1.5<sup>mm</sup>), spongy-cellular,

the surface broken with deep irregular pits, yellowish green or reddish, especially at the margins, the ultimate divisions much crowded and often overlapping, naked at the margins and underneath; capsules deeply imbedded in the spongy thallus, not apparent above but the spores ultimately break through the upper side of the thallus; spores 90–127 $\mu$  in diameter, black, opaque, slightly reticulate-rugose, with a narrow margin which gradually disappears with age.

Lower California, 1892. (*T. S. Brandegee.*)

The species north of Mexico may be separated by the following table in which spore characters, hitherto not recorded, are utilized in separating species, although wherever possible the characters of the thallus have been employed in order to make possible the discrimination of material in the sterile condition. *Riccia bifida* and *R. Beyrichiana* are omitted as there is no recent evidence that they are members of our flora.

*Thallus with large air cavities which communicate with the upper surface.* (SPONGODES Nees.)

- Upper surface of thallus spongy, pitted, green or tinged with purple . . . . . *R. crystallina* L.  
 Upper surface of the thallus mostly smooth except for the median groove; divisions long, yellowish green . . . . *R. lutescens* Schw.

*Thallus solid, mostly without air cavities.* (*R. lutescens* <sup>Handwritten</sup> (LICHENODES Bischoff.)

a. Thallus without scales or cilia on the margins or underneath.

i. Spores medium size or small (at least under 100 $\mu$ ).

1. Thallus only slightly reticulate above or not at all.

\* Spores small (60 $\mu$  or less).

Thallus with wide divisions, thin and flat; spores muricate-spinulose . . . . . *R. tenuis* Aust.

Thallus with narrow divisions.

Spores obscurely muriculate . . . . . *R. Frostii* Aust.

Spores coarsely reticulate . . . . . *R. Huebeneriana* Lindenb.

\* \* Spores larger (75–95 $\mu$ ).

Divisions of the thallus broad; spores nearly opaque, with large reticulations . . . . . *R. Catalinae* Underw.

Divisions of the thallus narrower; spores dark fuscous with deep reticulations (about 8 across convex surface). . *R. arvensis* Aust.

## 2. Thallus glaucous or white, clearly reticulate-papillose.

Spores brown, 65-80 $\mu$ , reticulate . . . . . *R. glauca* L.Spores unknown: thallus milk white above . . . . . *R. albida* Sulliv.*ii.* Spores very large (130-170 $\mu$ ) black, opaque.Thallus very large, 4-7<sup>mm</sup> wide . . . . . *R. Donnelli* Aust.*b.* Thallus scaly underneath, not ciliate.*i.* Scales and usually the thallus purple underneath.Thallus simple or forked: spores light brown anastomose-reticulate . . . . . *R. nigrella* DC.Thallus 1-3 dichotomous; spores nearly black, finely reticulate, almost opaque . . . . . *R. aggregata* Underw.*ii.* Scales usually whitish; thallus green underneath.Spores light brown, 84-94 $\mu$ ; scales reaching beyond the margin.  
*R. lamellosa* Raddi.Spores dark brown, 64-70 $\mu$ ; scales not reaching the margin.  
*R. minima* L.*c.* Thallus ciliate at the margins or apices.*i.* Spores black or nearly so.Thallus small; spores (about 85 $\mu$ ) reticulate with 10-12 areolæ across the surface . . . . . *R. ciliata* Hoffm.Thallus larger; spores 92-108 $\mu$ ; opaque, scarcely reticulate.  
*R. hirta* Aust.*ii.* Spores brown.Thallus simple or bifurcately lobed, spores 84-92 $\mu$ .  
*R. tumida* Lindenb.

Thallus stellate or fan-shaped, forming rosettes.

Spores 68-73 $\mu$ ; faintly reticulate with 12-14 areolæ across the convex surface . . . . . *R. Californica* Aust.Spores 85-110 $\mu$ , reticulate with 7-8 areolæ across the convex surface . . . . . *R. Lescuriana* Aust.

The following geographic distribution shows rather the paucity of our information than the real limits of the range of most of the species. Six species are known only from California, viz.: *RR. aggregata*, *Californica*, *Catalinæ*, *ciliata*, *glauca* and *tumida*.

*R. Donnelli* is known only from Florida.

*R. albida* is known from Texas and Louisiana; *R. hirta* from New Jersey and California.

*R. nigrella* is known from California, New York and Pennsylvania; *R. Hubeneriana* from Massachusetts, New Jersey and Ohio; *R. Lescuriana* from New Jersey, Florida and Illinois.

*R. lamellosa* is known from Ontario, New Jersey, Alabama and California.

*R. arvensis* from Connecticut, New Jersey, Ontario and District of Columbia; *R. crystallina* from Illinois, South Carolina, Colorado, and Nevada.

*R. minima* is known from New York, New Jersey, South Carolina, Illinois and California, *R. tenuis* from New Jersey, Delaware, Ohio, Missouri and Arkansas.

*R. Frostii* is known from Ohio, Illinois, Missouri, Kansas, S. Dakota, Idaho, Montana, and Colorado.

*R. lutescens* leads the list, being known from Massachusetts, New York, Virginia, Tennessee, Louisiana, Ontario, Ohio, Illinois, Minnesota and Idaho.

From 21 states there are no Riccias reported and fourteen others have reported each a single species.<sup>2</sup>

The above showing would strongly point to the fact that there is need of much local observation before we can form any rational idea either of the extent of the genus as developed in America or of its geographic distribution.

*Greencastle, Indiana.*

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<sup>2</sup> *Ricciocarpus natans* and *Ricciella fluitans* formerly included in this genus have a much more extended distribution.